

# (12) UK Patent Application (19) GB (11) 2 273 478 (13) A

(43) Date of A Publication 22.06.1994

(21) Application No 9325413.4

(22) Date of Filing 13.12.1993

(30) Priority Data

(31) 4243147 (32) 19.12.1992 (33) DE

(71) Applicant(s)

Mercedes-Benz AG

(Incorporated in the Federal Republic of Germany)

70322 Stuttgart, Federal Republic of Germany

(72) Inventor(s)

Helmuth Herwig

Rainer Hoffman

Alfred Schnabel

(74) Agent and/or Address for Service

Jensen & Son

70 Paul Street, LONDON, EC2A 4NA, United Kingdom

(51) INT CL<sup>5</sup>

B60K 13/04 15/063

(52) UK CL (Edition M )

B7H HLD HNV

(56) Documents Cited

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DE 004029605 A1

(58) Field of Search

UK CL (Edition M ) B7H HLD HNV

INT CL<sup>5</sup> B60K 13/04 15/063 15/067 15/073 , B60R

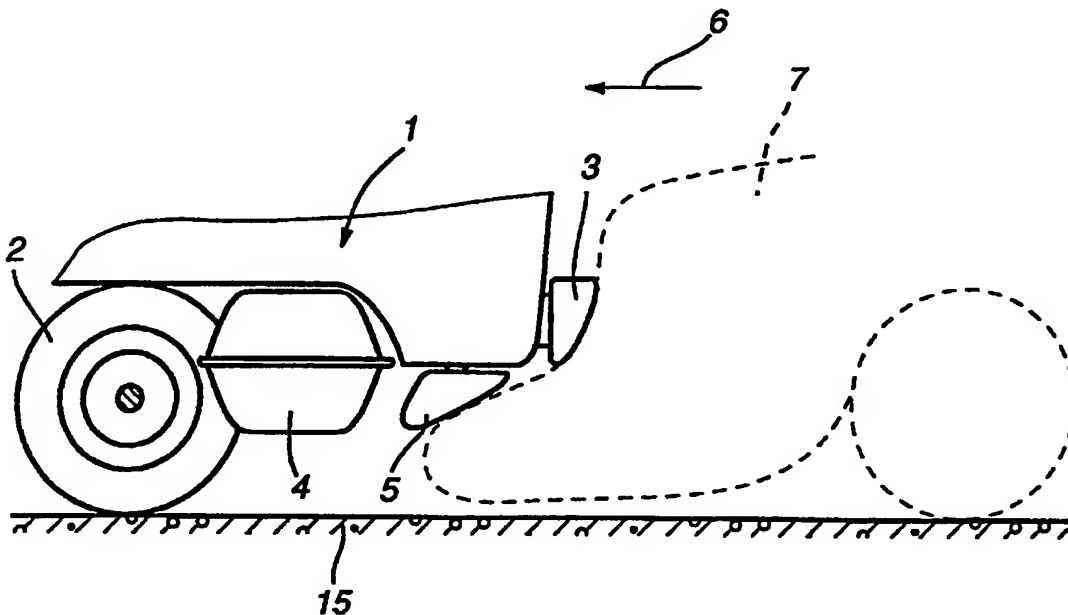
19/02 19/48 , B62D 21/15

Online database: WPI

(54) Arrangement of exhaust silencer and fuel tank in a motor vehicle.

(57) The silencer 5 is wedge-shaped in cross-section and is arranged after the fuel tank 4 at the rear to protect the fuel tank in a rear-end collision. The silencer 5 is fastened to the body floor by means of a flexible mounting 12 which is provided with a reinforcing element 9 which retains the tank in position in the event of a rear end collision. The reinforcing element 9 may be a high-strength cage which surrounds the flexible mounting 12, as shown, or may be a wire core which is embedded in the flexible mounting itself (Fig. 3).

Fig. 1



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Fig. 1

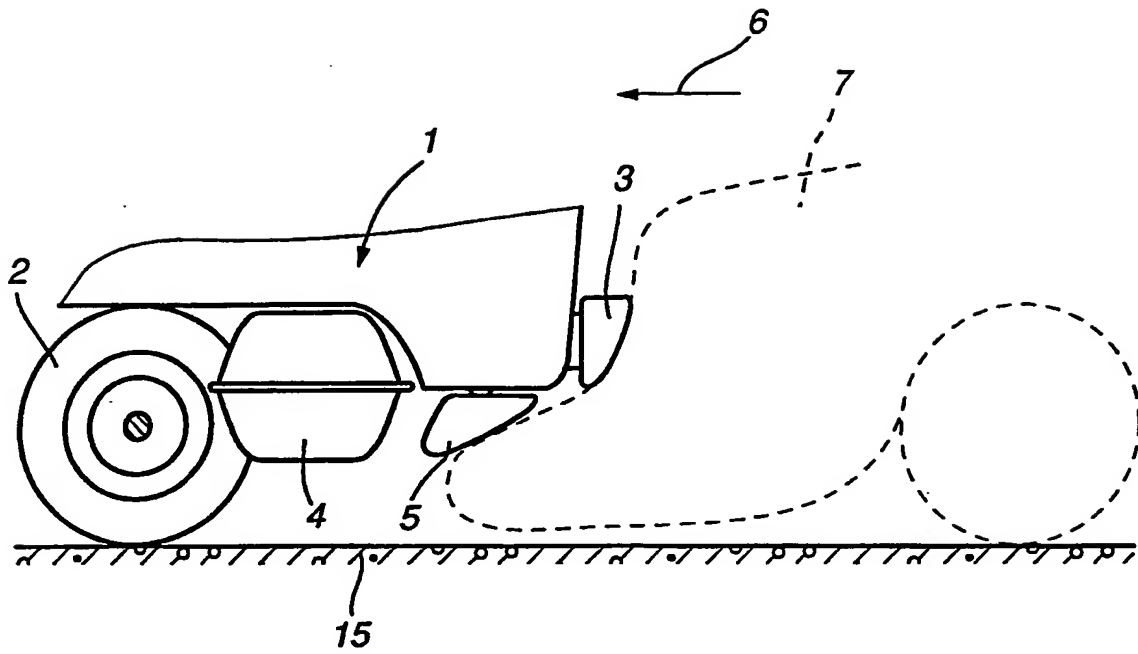


Fig. 2

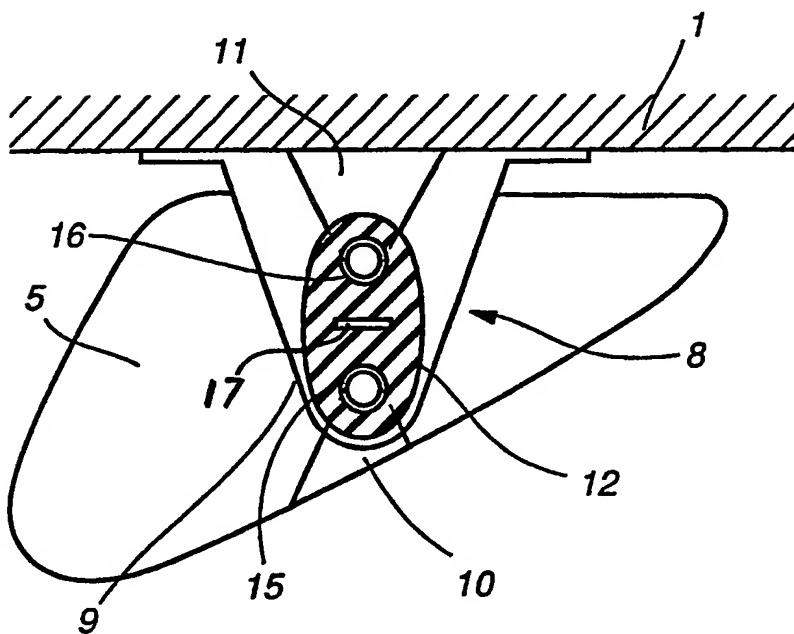
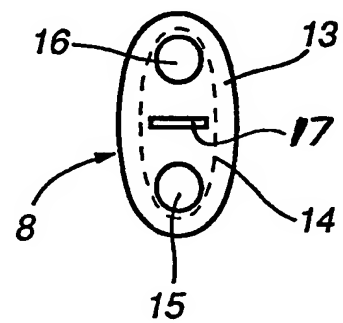


Fig. 3



A motor vehicle with a body floor

The invention relates to a motor vehicle with a body floor, on which a tank is arranged behind the rear wheel axle and a silencer of the vehicle exhaust system is arranged behind the tank.

In a passenger car according to DE 4 029 605 A1 the fuel tank is arranged behind the rear wheel axle. A transverse member is provided behind the fuel tank to protect the latter against a rear-end collision by another vehicle. An exhaust silencer box of the exhaust system is arranged behind and parallel to this transverse member.

From DE 2 554 513 A it is known to design the end silencer of the exhaust system in an elongated form and to use it as an energy-consuming component of the bumper. Space problems were a crucial factor for this design.

The present invention seeks to produce a vehicle which, using simple means, more effectively protects the fuel tank against a rear-end collision.

According to the present invention there is provided a motor vehicle with a body floor, on which a tank is arranged behind a rear wheel axle and a silencer of the exhaust system is arranged behind the tank, wherein the silencer is arranged directly after the tank at the rear in such a manner that the lower edge of the silencer, relative to a plane defined by the ground, is at approximately the same level as the lower side of the tank, the silencer having a wedge-shaped cross-section widening towards the tank and being fastened to the body floor by means of a flexible mounting which is provided with securing means.

The arrangement of the silencer relative to the fuel tank protects the latter against a rear-end collision by another vehicle. In order to avoid the silencer being torn out of its flexible mounting in the case of a collision by another vehicle, said mounting is provided with the securing means. The silencer therefore remains in its position protecting the fuel tank even in an accident.

In a development of the invention a catching cage made of a high-strength material is provided around the flexible mounting as a securing element. In a further development, a wire core is provided in the flexible mounting as a securing element. The securing elements prevent the silencer from falling to the ground in a crash. Despite this way of securing the silencer to the body floor, the flexible mounting necessary for the silencer is retained.

In a further development of the invention the silencer has a wedge-shaped cross-section widening towards the tank. This wedge shape of the silencer causes the colliding vehicle to be forced downwards, as a result of which the protection of the fuel tank is further improved.

In a further development of the invention, the lower edge of the silencer, relative to a plane defined by the carriageway, is at approximately the same level as the lower side of the tank. As a result, silencer and tank form a common wedge which forces the colliding vehicle downwards.

Embodiments of the invention will now be described by way of example with reference to the drawings, in which:-

Fig. 1 shows, in diagrammatic form, a side section of the rear part of a passenger car, in the region behind the rear wheel axle, according to one embodiment of the invention in which a wedge-shaped silencer is arranged directly behind the fuel tank,

Fig. 2 shows, in diagrammatic form, an enlarged representation of the silencer according to Fig. 1, in which the silencer is held on the body floor by means of a flexible mounting secured by a catching cage, and

Fig. 3 shows a sectional view of an embodiment of a flexible mounting for the silencer, the mounting having a wire core by means of which the silencer remains fixed to the body floor even in the case of high, impact-like loads in the form of a rear-end collision.

Arranged in the rear region of a passenger car according to Fig. 1 is a rear wheel axle to which two wheels 2 are fastened in a known manner. Towards the rear of the

passenger car a body floor 1 of the passenger car has behind the rear wheel axle a recess in which a tank 4, for holding fuel, is arranged. A bumper 3, which is connected to load-bearing parts of the body floor 1, is arranged at the rear of the passenger car. Arranged on the body floor 1, likewise from below, between the rear provided with the bumper 3 and the tank 4 of the passenger car, is a silencer 5 of the exhaust system, which forms the end silencer of this system.

The silencer 5 has an elongated form which is arranged on the body floor 1 transversely across the vehicle parallel to the bumper 3 and to the rear wheel axle. The silencer 5 is arranged directly after the rear side of the tank 4. It has a wedge-shaped cross-section, the largest width of which is located directly after the tank 4, and which tapers towards the bumper 3.

In order to be able to compensate for certain movements of the exhaust system and of the engine during driving as well as for relative movements of the body of the passenger car, the silencer 5 is fastened to the body floor 1 by means of a flexible mounting 8 shown in Fig. 2. In the embodiment according to Figs. 1 and 2, the silencer 5 has two mounting points which are of identical design. Only one flexible mounting 8 is therefore represented in Fig. 2 by way of example. Located on the silencer 5 is a fastening flange 10, acting on which is a flexible element 12, the upper end of which is connected to a bearing element 11 rigidly arranged on the body floor 1. The flexible element 12 is produced, for example, from a firm rubber. The flexible element 12 is an elongated, oval solid-rubber element which is provided at two opposite end regions with two circular openings 15 and 16, in which the fastening flange 10 of the silencer 5 and the bearing element 11 of the body floor 1 respectively engage. In its central region the flexible element 12 has an approximately horizontal slot 17, by means of which the flexible element 12 is weakened and due to which said element can be elastically stretched in the longitudinal.

direction. A catching cage 9 made of a high-strength material, for example a metal, or of a glass-fibre or carbon-fibre plastic, is led around the lower side of the flexible element 12 and fixed to the body floor 1 at two fastening points not described in further detail.

Said catching cage 9 is, for example, a strap which is led around the fastening flange 10 of the silencer 5 in such a manner that the fastening flange 10 is secured against falling downwards and is caught in the strap. In normal driving, the catching cage 9 does not exert any supporting forces on the flexible mounting 8 or on the silencer 5. It is only in the case of a rear-end collision by another vehicle, resulting, for example, in the flexible element 12 tearing, that the silencer 5 is caught in the catching cage 9.

In another embodiment according to Fig. 3 a wire core 14 is embedded in a flexible element 13, which in its basic structure corresponds to the flexible element 12, to secure the flexible mounting 8. Said wire core 14 is laid in a ring shape around the two openings 15 and 16, so that it does indeed reinforce the flexible element 13 but nevertheless permits elastic compliance in the longitudinal direction of the flexible element 13. Said wire core 14 secures the silencer 5 against falling down in the case of high loads.

As a result of these securing means, the flexible mounting 8 of the silencer 5 is retained and, nevertheless, the silencer 5 remains in its fastening position even in an accident, since the securing means limits the movement of the flexible elements preventing them from tearing, thus ensuring that the tank is retained in position. As soon as a vehicle 7 collides, in the direction of the arrow 6, with the rear of the passenger car according to Fig. 1, the front of the vehicle 7 is forced first by the silencer 5 and then in addition by the lower side of the tank 4 under the rear of the passenger car while, at the same time, the rear of the passenger car is raised.

So that the tank 4 can reinforce the wedge effect of the

silencer 5, the lower side of the tank 4 and the lower edge of the wedge-shaped silencer 5, relative to a plane defined by the carriageway 15, are arranged at approximately the same level. The silencer 5 offers, moreover, a further protection for the tank 4. Due to the fact that the silencer 5 is hit before the tank 4 in the case of a rear-end collision, sharp objects or parts of the vehicle 7 cannot penetrate into the wall of the tank 4. By this means, damaging the tank 4 in such a manner that fuel could run out is ruled out.

CLAIMS

1. A motor vehicle with a body floor, on which a tank is arranged behind a rear wheel axle and a silencer of the exhaust system is arranged behind the tank, wherein the silencer is arranged directly after the tank at the rear in such a manner that the lower edge of the silencer, relative to a plane defined by the ground, is at approximately the same level as the lower side of the tank, the silencer having a wedge-shaped cross-section widening towards the tank and being fastened to the body floor by means of a flexible mounting which is provided with securing means.
2. A vehicle according to Claim 1, wherein a catching cage made of a high-strength material is provided around the flexible mounting as a securing means.
3. A vehicle according to Claim 1, wherein a wire core is provided in the flexible mounting as a securing means.
4. A motor vehicle having a fuel tank arranged behind a silencer, substantially as described herein with reference to and as illustrated in the accompanying drawings.



**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

7.

Application number  
GB 9325413.4

**Relevant Technical Fields**

- (i) UK Cl (Ed.M) B7H (HLD, HNV)  
(ii) Int Cl (Ed.5) B60K 13/04, 15/063, 15/067, 15/073; B60R 19/02, 19/48; B62D 21/15

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASE : WPI

Search Examiner  
J L TWIN

Date of completion of Search  
27 JANUARY 1994

Documents considered relevant following a search in respect of Claims :-  
1-3

**Categories of documents**

- X:** Document indicating lack of novelty or of inventive step.      **P:** Document published on or after the declared priority date but before the filing date of the present application.  
**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.      **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.  
**A:** Document indicating technological background and/or state of the art.      **&:** Member of the same patent family; corresponding document.

| Category | Identity of document and relevant passages | Relevant to claim(s) |
|----------|--|----------------------|
| A        | GB 759592 (DAIMLER-BENZ) - see eg Figure 1 | 1                    |
| A        | DE 4029605 A1 (ADAM OPEL)                  | 1                    |

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